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OF
Saratoga

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AN
ANALYSIS
OF THE
MINERAL WATERS
OF
SARATOGA AND BALLSTON,
With practical remarks on their use in various diseases.
CONTAINING OBSERVATIONS
ON THE
GEOLOGY AND MINERALOGY
Of the surrounding country,
WITH A
GEOLOGICAL MAP.

Second Edition, enlarged and improved.

BY DOCTOR JOHN H. STEEL,

Resident at the Springs,

*President of the Saratoga Medical Society, and Honorary
Member of the New-York Historical Society.*

"These are thy glorious works, Parent of good;
"Almighty, thine this universal frame,
"Thus wondrous fair; thyself how wondrous then!"

ALBANY:

Published by D. STEELE, No. 472 South Market-street,
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.....

1819.

Southern District of New-York, ss.



BE IT REMEMBERED, That on the twenty-first day of April, in the forty-third year of the Independence of the United States of America, J. H. STEEL, of the said District, hath deposited in this office the title of a book, the right whereof he claims as author, in the words following, to wit:

“An Analysis of the Mineral Waters of Saratoga and Ballston, with practical remarks on their use in various diseases; containing observations on the Geology and Mineralogy of the surrounding country, with a geological map. Second edition, enlarged and improved. By Doctor John H. Steel, resident at the springs, president of the Saratoga Medical Society, and honorary member of the New-York Historical Society.

“These are thy glorious works, parent of good;

“Almighty, thine this universal frame,

“Thus wondrous fair; thyself how wondrous then.”

In conformity to the act of the Congress of the United States, entitled “An act for the encouragement of learning, by securing the copies of maps, charts, and books to the authors and proprietors of such copies, during the time therein mentioned.” And also to an act, entitled “An act, supplementary to an act, entitled an act for the encouragement of learning, by securing the copies of maps, charts and books to the authors and proprietors of such copies, during the times therein mentioned, and extending the benefits thereof to the arts of designing, engraving and etching historical and other prints.”

JAMES DILL,

Clerk of the Southern District of New-York.

By EDWD. TRENOR, *Assit. Clk.*

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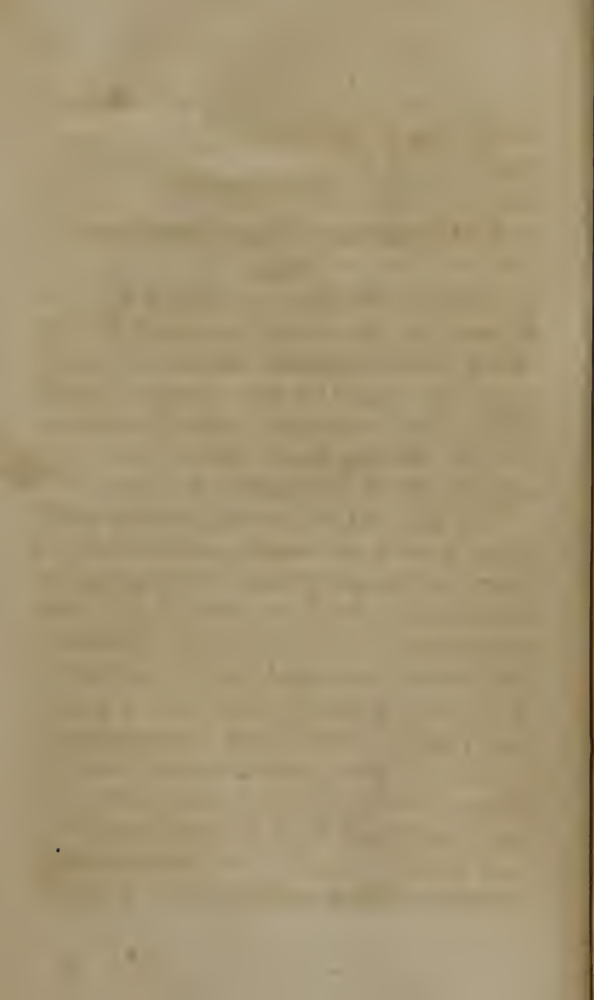
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ANALYSIS, &c.

Preliminary Observations.

WERE it deemed necessary to apologize for the re-appearance of this work, the materials for the apology might be found in the constant inquiries of the numerous visitants who resort to the Springs, and in the very rapid sale of the former edition.

To this edition considerable additions have been made, particularly to that part relating to the geology of the surrounding country, which, from the suggestions of several literary friends, has been arranged in a systematic form, and accompanied with a geological map. From this circumstance, it became necessary to make some additions to the geographical remarks; but they have been as much compressed as the nature of the subject would admit. While on this topic, I should

do injustice to my feelings were I not to acknowledge the obligations I am under to Amos Eaton, Esq. For, although I had settled the outline before Mr. Eaton visited the county, his experience in geological researches was of great use to me in the more minute investigations, while I accompanied him to every interesting part of the district.

The chemical processes are published in this as they appeared in the former edition; and they are adopted, not from an idea that they form the *most* accurate method of determining the quantities of the articles contained in the waters, but from a conviction that they form the most *simple* and *accessible* mode of *judging* of the accuracy of the results; and it is believed that they will not be thought the more exceptionable from their being within the comprehension of those who possess but a slight acquaintance with chemical science. Had the whole of the various experiments and process-

es, from which the inferences were drawn, been published, they would have composed a large volume, and been altogether uninteresting to the most, if not all, those into whose hands they might have fallen.

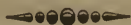
The examination of two new springs, one at Saratoga, and the other at Ballston Spa, has been added to this volume; likewise some additional practical remarks relative to the application of the waters in diseases, and a tabular view of the comparative properties of the most celebrated mineral waters of the old and new world.

The whole is comprised in as compact and portable a form as could well be admitted, and is presented to the public under an impression that it contains all the *important facts* relating to the subject, without being blended with any of those *prolixities* which too often render the perusal of works, of this kind, uninteresting and tiresome.

Geographical Observations

ON THE

COUNTY OF SARATOGA.



THE surrender of General *Burgoyne*, and the *medicinal springs* within its precincts, have given a celebrity to the name of *Saratoga* which few other places in the Union possess. A description, therefore, of the surrounding country will be deemed interesting, not only as it relates to the situation of the *springs*, but, particularly, as it will enable invalids, as well as men of pleasure, to make such arrangements before visiting the place as may be most conducive to their comforts and pleasures while there.

The county of *Saratoga* is separated from the counties of *Rensselaer*, *Washington*, and a part of the county of *Warren*, by the *Hudson river*, which washes its eastern side, in its windings, more than seventy miles; on the south it is bounded partly by the *Schenec-*

tady patent, and partly by the Mohawk river, which separate it from the county of Albany; it has the county of Montgomery, and a part of Hamilton, on the west; and the remaining part of Warren county terminates its northern limits. It lies between $42^{\circ} 46'$ and $43^{\circ} 23'$ north latitude, and $0^{\circ} 26'$ east, and $0^{\circ} 10'$ west longitude from the city of New-York. It contains about 770 square miles, and has, at this time, a population of nearly 40,000 inhabitants.

The northwestern section of the county, comprehending the towns of Edinburgh, Hadley, Corinth, Providence, Greenfield, and the west part of the towns of Moreau and Wilton, is mountainous; being situated in the line of that extensive chain of primitive mountains which extend from the confines of Canada, and occupy all that part of the state of New-York which lies between lake Champlain and the river St. Lawrence. The mountains, in this tract, form two con-

spicuous ridges or elevations through this part of the county. The first, or easternmost range, commences near the head of lake Champlain, and, pursuing a southwestern course, passes a little to the south of lake George, crosses the Hudson into the west part of the town of Moreau, about six miles to the west of Glen's Falls, and continuing the same course through Wilton, and a part of Greenfield, terminates or is lost in the plain lands in the immediate vicinity of the mineral fountains in Saratoga. This range is called the *Palmertown mountain*. The more westerly ridge passes from the west side of lake George, crosses the Hudson into Hadley, near the mouth of the Sacandaga river, and, pursuing a course nearly parallel to the former, passes the towns of Corinth and Providence into the county of Montgomery, and disappears in the less elevated country towards the Mohawk. This range is distinguished by the name of the *Kayadarosseros mountain*.

The eastern side of the Palmer-town range commences abruptly, and, in many places, presents an almost perpendicular front, that rises several hundred feet above the level of the plain that skirts its base, exhibiting an undulating surface of rounded summits that gradually decrease in elevation until they sink to the level of the surrounding country at Saratoga. From the top of this range, the land declines towards the west, presenting an uneven surface until it comes in contact with the more western or Kayadarosseros mountain, from six to eight miles distant. Here the eastern aspect is very similar to the former, the elevation of the mountain commencing abruptly, forming steep ascents, and terminating in rounded tops; from whence the country, to the west, sinks by a gentle declivity until it reaches another range, more distant, in the county of Montgomery.

These mountains furnish a great variety of timber of a very luxuriant

growth, among which are to be found the white pine, (*pinus strobus*) hemlock spruce, (*pinus canadensis*) beech tree, (*fagus ferruginea*) black birch, (*betula lenta*) white oak, (*quercus alba*) chestnut tree, (*cestanea vesca*) soft maple, (*acer rubrum*) sugar maple, (*acer saccharinum*) &c.

Although the exposure of the rocky surface, and the abruptness of the ascent, of some parts of this elevated country, will forever prevent its being cultivated; still, by far the greater part is capable of a high state of cultivation. The rapid improvement it is undergoing points to no very distant period, when it will furnish the best grazing lands in the county.

The remaining part of the county, comprehending all the southern and eastern sections, amounting to something more than two-thirds of the whole, presents a tolerably level surface, with numerous rounded elevations and extensive plains of sandy land, producing

the pitch pine (*pinus rigida*) in great abundance.

The town of Saratoga seems to require a particular description. Not merely on account of its being the site of some of the most celebrated mineral fountains which abound in the county; but particularly on account of its having been the theatre, where some of the great and important scenes of the revolution, which materially contributed to the establishment of the *independence* and *sovereignty* of our country, were transacted.

*The town is fourteen miles in length, from east to west, and from five to six in width, from north to south. It has for its boundaries the Hudson river on the east, the towns of Northumberland, Wilton and Greenfield on the north, Milton on the west, and Malta and Stillwater on the south. The northern

* During the late session of the legislature the town was divided; the western division, in which the Springs are included, is named Saratoga Springs, while the eastern section retains the old name of Saratoga.

part of Saratoga lake (which is about nine miles in its whole extent, from north to south, and from two to four in breadth) is situated near the centre of the town, from east to west, on its south line. It is supplied with water chiefly by the Kayadarosseros creek, which has its source in the mountain of the same name, about twenty miles distant, in a northwest direction. After taking a circuit of more than forty miles, and receiving the contributions of several considerable streams, it empties its waters into the lake near its northwest corner. This beautiful lake retains its clearness and depth, without much variation, through the year.

The Kayadarosseros creek, which forms a part of the southern boundary of the town, and separates it from Malta, is, like several others in the county of less extent, peculiarly well adapted for mill seats. It passes through a very fertile country, which was formerly covered with great quantities of tim-

ber. The number of mills that have been erected on it is truly astonishing. Many of them, however, have disappeared with the forests that caused them to be built; but they have established a reputation not to be forgotten. Whenever our country shall be in a situation to support manufactories, this creek will present strong inducements, as long as *water power* shall be preferred to that of *steam*, for the enterprising manufacturer to establish himself on its borders.

The Saratoga lake discharges itself by the *Fish creek*, which passes from the north end of the lake, through the town of Saratoga, to the Hudson, and discharges its waters into that river near the village of Schuylerville, formerly so famous for its herring fishery. Previous to its union with the Hudson, it forms several fine falls, on which the proprietors have erected mills of various kinds.

On the flat land, adjoining the river, to the north of the *Fish creek*, are

still to be seen the remains of the fortified camp erected by General Burgoyne on his retreat, after the disastrous battles at Stillwater and Saratoga. At this place he capitulated and surrendered his whole army to the American forces under General Gates.

The places of the several engagements, that gave rise to this important event, are all within a days ride of this place. The first battle was fought on the 19th of August, 1777, at Bennington, in the state of Vermont, about twenty miles to the southeast, by a detachment of the main army, which were repulsed. On the 19th of September following, the battle at *Bemus' Heights*, in Stillwater, was fought, about twelve miles to the south of the Fish creek. After which Burgoyne fell back to Saratoga, where, on the 7th of October, a general engagement was fought, when the *royal troops* were totally defeated, and retired over the Fish creek to the place of their capitulation. This took place on the 17th

of the same month. The little intrenchment, called *fort Hardy*, the last retreat of the discomfited General, is still to be seen, as are likewise many of the works that were thrown up at Bemus' Heights and at Saratoga.— Here, at this latter place, obscured by brambles, and neglected by the world, still rest the remains of the brave but unfortunate General *Frazer*, who fell at the head of his division in the action of the 7th. A few *decayed logs* form the only monument that mark the spot of his repose.

The town of Saratoga presents a variety of soils. On the borders of the Hudson river, and along the Kayada-rosseros and Fish creeks, there are extensive flats of alluvial land, extremely productive in grass. The lands to the south of Fish creek, and east of Saratoga lake, are uneven, composed principally of gravelly loam combined with argillaceous earth, and are very fertile. But the north and western parts of the town are mostly

sandy plains, forming a link of that extensive chain of plain lands which stretch along the course of the Hudson, in a southerly direction, as far as the Highlands. The plains in the vicinity of the Springs, are considered by the farmers of a much better quality than they usually are in other parts of the county. This preference arises from their having a level surface, and from the soil not being composed of sand only, but possessing a large admixture of *loam*.

The application of *gypsum* has rendered these lands very productive, not only in grains, but likewise in *clover* and *timothy* grasses. Such has been the magic effects of this excitement to vegetation, that these lands, which, but a few years past, were considered of but little value, are now as much esteemed, and sell for as high a price as any in the county. Saratoga may, therefore, be considered as highly valuable for agriculture, as it produces the various grains and grasses in great abundance.

Geological Observations

ON THE
COUNTY OF SARATOGA.



THE three great divisions of *stratification*, established by modern geologists, as distinct classes, are all distinguishable in this county; viz. primitive, transition and secondary.

The strata found in these different formations consist of

I.

Primitive class, (*coloured yellow on the map.*)

GRANITE.

GNEISS.

SIENITE.

MICA SLATE &

SOAP-STONE.

II.

Transition class, (*coloured blue.*)

ARGILLACEOUS SLATE &

GRAY-WACKE.

III.

Secondary class, (*coloured red.*)

COMPACT LIMESTONE.

I.

Primitive class.

Granite.

The primitive formation occupies all the northwestern part of the county, which has been described as mountainous, and is the southern termination of an extensive range from the north. It approaches to within one mile of the Springs at Saratoga, where it dips beneath the more recent formations, and is not seen again in a southern direction, unless it appears at the Highlands in the vicinity of the Hudson river, below Poughkeepsie. The southernmost point, at Saratoga, is composed principally of *granite*, on which, in many places, rest extensive layers of *gneiss*. The granite rises to the top of the mountain near where the Hudson crosses the Palmertown range, and after forming the bed of the river for some distance, sinks beneath the *gneiss*; and is only observable at the base of the mountain, along its eastern face, and at its southern extremity. This

granite is of a coarse granular structure, and frequently contains *schorl*, *sulphuret of molybdena*, and, in some instances, *magnetic iron*.

Gneiss.

This stratum extends from the top and along the west side of the Palمرتown range, where it visibly rests on the granite, to beyond the Kayadaroseros mountains, including, with the few exceptions where the granite shows itself, the whole of the intervening space, and apparently forms the entire composition of the latter mountain.—The layers, which compose this stratum, decline very moderately to the west, looking up towards the granite ridge of the Palmertown range. Where the Hudson crosses this tract, a little above the falls at Hadley, the rock has passed away to the depth of fifty or sixty feet. At this place the regularity and declination of the strata are beautifully exhibited, and what must be considered an interesting and extraordinary fact, is, that the gneiss is

here interrupted by a thin but extensive stratum of *puddling stone*, composed of rounded pebbles cemented by sand and lime, and accompanied by a kind of *calcareous granular quartz*, containing small masses of *calcareous spar*. These strata seem to run into each other, and, in some instances, form like connections with the gneiss which rests immediately above and below them.

This stratum contains numerous masses of *iron pyrites*, or sulphuret of iron, suitable for the manufactory of sulphur. These are, in some places, combined with an iron ore, which, containing a much less quantity of sulphur, appears more suitable for the furnace.

Gornets and *graphite* are likewise found in these rocks. This graphite, or carburet of iron, is of a foliated structure. Numerous specimens of *amorphous granular graphite*, of a pretty fine quality, have been picked up in this vicinity also.

Sienite, or Hornblende Rock.

This rock has not yet been observed in a regular stratum here; but from the immense quantities of detached and rolled masses, observed every where in this quarter, there can be no doubt that it occupies a place among the primitive strata.

Mica Slate.

This rock extends along the southern termination of the mountain, and is, to all appearance, the last of the primitive class in *this* direction. It forms a moderate dip to the south, looking up to the granite and reposing on the gneiss. It is only discoverable for the distance of about a mile, when it is either obscured by the alluvial, or passes beneath the transition. It contains an abundance of *garnets*.

Steatite, Soap-Stone, or Talcose Rock.

This stratum has been observed along the foot of the Palmertown mountain, in the vicinity of the granite, near the south line of the town of Moreau.

II.

Transition class.

Argillaceous Slate.

This rock, excepting the space occupied by the primitive, appears to underlay the whole county. It forms the bed of the Mohawk to above Schenectady, and that of the Hudson to the vicinity of Baker's falls, opposite Moreau. It is likewise observable in the interior of the county, at the bottom and along the shores of the lakes, both at Ballston and Saratoga, and it discovers itself in the banks and at the bottoms of all the rivulets which pass to any considerable distance from the foregoing class.

The layers of this formation are frequently curved, but in other instances they are straight, and separate with ease into thin plates, some of which appear suitable for *roof slate*. The surface of the layers are in some instances covered by minute scales of the carbonate of lime, which, from its effervescing with acids, has induced

some persons to imagine that lime entered into its composition. Other specimens, particularly some found about Ballston Spa, have been mistaken for *bituminous shale*, from the circumstance of the surface being stained with *graphite* or black lead.*

Considerable masses of *chlorite* are occasionally found imbedded in this stratum. The thin curved layers are sometimes stained by the *red oxide of iron*. Some of the more solid masses are frequently observed to enclose small cubic crystals of the sulphuret of iron. The dip is uniformly to the southeast.

Gray Wacke.

This rock is found resting on the foregoing, and forming the summit of some of the insulated elevations in different directions, throughout the southern and eastern parts of the county.—It underlays and alternates with the

* This plumbago glazing, so common about Albany and Troy, has lately been analyzed by Professor Silliman, at the request of the Troy Lyceum.

secondary lime-stone, and, in some places, is observed to rise between this last and the primitive.

III.

Secondary class.

Compact Limestone.

This formation occupies, comparatively, a narrow space, running in a northeast and southwest direction through the county. It commences near the head of lake Champlain, and crosses the Hudson at Glenn's Falls, from whence it is covered by the alluvial until it approaches the foot of the Palmertown mountain, in the town of Wilton. Here, in many places, it apparently rests on the primitive; but in others it is separated by the intervening stratum of *gray wacke*. In this manner it continues along the base of the mountain, just touching, with its outer edge, the mineral springs at Saratoga, and, not improbably, those at Ballston Spa; although, at this latter place, it is deeply covered by the alluvial. Passing through Galway and Charlton, it cross-

es the Mohawk above Schenectady, and is again observed along the *Heldebergh*. According to Maclure, this stratum is continued and spread out to the great western mountains beyond the Mississippi.

Most of the rock which composes this extensive range is of a dark colour, and, when properly burned, forms a very pure lime, giving out, when first heated, a strong sulphurous odour. It contains a great variety of *organic remains*; among which are the *celleporites*, *pectenites*, *orthoceratites*, *gryphites*, *ostriatites*, *amonites*, *corallinites*, *cardites*, *terebratulites*, &c. &c.

This rock is overlaid, and in some places alternates, with a kind of *sandstone* or *calcareous quartz*, called by the lime burners *bastard lime rock*, in which are imbedded great quantities of *hornstone*, which some have described under the term of *chert* or *flint*. Beautiful transparent crystals of *quartz* are likewise found, in great abundance, in the cavities and fissures of this rock.

and specimens of *calcareous spar* are disseminated throughout its substance.

Small fragments of crystalized *fluat* of *lime* have been picked up among the broken limestone, in the vicinity of the springs; but its geological connection has not yet been observed.

Those who advocate that theory, which supposes the Highlands, in the vicinity of Westpoint, at some distant period, to have presented an impassable barrier to the waters of the Hudson,* will find much to corroborate and strengthen the opinion by an examination of the course, form and structure of the extensive range of mountains on the east and west side of that river; and from a particular reference to the *peculiarities* in the formation of the extensive and fertile region placed be-

* In this case the waters, doubtless, communicated with the ocean through the gulf of St. Lawrence. This is rendered probable from the curious fact, that the water, which falls from the gutters on one side of the street at the village of Glenn's Falls, passes off through lake Champlain; while that which falls on the opposite side, finds its passage to the ocean by the way of the Hudson, which passes but a few rods below.

tween them. But as this would be embracing a subject that is not immediately connected with the present work, it is deemed improper to discuss it here.

The *alluvial formation* is composed of little else than what might be expected to result from the disintegration of the adjacent rocks. Any description, therefore, is unnecessary; excepting such as will naturally arise from the observations on the several fountains, to which subject I now beg leave to direct the attention of the reader.

Observations on the Springs.



The *mineral waters*, which are becoming so celebrated in the history of our country, are all situated just along the verge of the secondary, and not far from the Transition formation.*—Those at Saratoga seem to form the *centre* of a long range, in the form of a crescent, commencing at Ballston lake, about eleven miles to the southwest, and terminating at the Quaker Springs, in Stillwater, about ten miles to the southeast.

At Ballston they discover themselves, very faintly, in a spring on the west side of the Long lake, and in

* This corresponds with the observations of that distinguished geologist, William Maclure, Esq. who says, "on the edge of the Secondary, not far distant from the Transition, have been found the most productive *salt springs* yet discovered in North America." Now as muriate of soda or common salt, is one of the principal ingredients in these fountains, and taking into consideration their local situation, may we not, with propriety, infer, that if the earth be penetrated to sufficient depth, pure and valuable salt springs may be obtained?

some wells near the academy. At the *Spa* they are very strong. They appear again in the course of the same circle at Ellis' mills, and at Saratoga they are more numerous and diversified in their sensible qualities than at any other place. The whole marsh, extending from the Washington Spring on the west to Taylor's on the east, the distance of considerably more than a mile, appears to be almost entirely occupied by them. At the Quaker Springs, on the east side of Saratoga lake, they again appear, less strongly characterized; beyond which they have not yet been traced.

All the mineral fountains in this crescent, as far as they have been examined, appear, with few exceptions, to possess the same *qualities*; differing only in the *quantity* of the substances common to all. We are therefore led to believe that they receive their essential and characteristic properties in one extensive laboratory; and being sent out from thence, through different

conduits, acquire from them, in their passage to the surface, the various abstractions which constitute their real difference.

The spontaneous decomposition of iron *pyrites*, which abounds in the mountains to the west and north, and the consequent formation of the *sulphate of iron*, might be supposed to have the effect of evolving the *carbonic acid gas*, contained in the waters, from the lime-stone, with which the solution of the sulphate of iron might be supposed to come in contact. But the total absence of a sulphate of any kind, in the waters, does away the *probability* of this theory. As there is no property in the soils around the different fountains to which we can impute the origin of their sensible qualities, we must acknowledge our ignorance of any known causes by which we can explain the various combinations that terminate in the production of these waters.

Dr. Seaman has conjectured that the gas is driven from its union with lime by the effects of subterranean heat;* in which case the fountains may be considered as those of pure carbonic acid gas, in which the water, and the several articles held in solution by it, are altogether accidental ingredients. The conjecture is certainly a plausible one; and there may be fountains of this gas, in the vicinity, uncombined with water, which, issuing from caverns, mingles with the atmosphere unnoticed. This is no more than what actually takes place at the celebrated *Grotto del Cane*, near

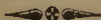
* Some idea may be formed of the extent of the process, which is constantly employed, in the production of this gas, from an estimation of the quantity extricated in a given time. Suppose the Springs at Saratoga, alone, to give off 32 gallons of water per minute, which is certainly but a moderate calculation, this water contains its bulk of fixed air, and the *disengaged gas* constantly emitted from the fountains is equal in volume to the water; therefore, we have, from a fair deduction, 64 gallons per minute, or 92,160 gallons daily. If to this we add the quantity produced at Ballston-Spa, and the several other places in the vicinity, the amount will double this calculation.

Naples; and had we a *Vesuvius* in the neighborhood, we should find no difficulty in accounting for its appearance here. But as this opinion is altogether speculative, it is deemed unnecessary to detain the reader from what may probably excite more interest.

HISTORY

OF THE

SPRINGS.



THE patent of Kayadarosseros, containing about 400,000 acres of land, was granted by Queen Ann, in the year 1708, to thirteen proprietors. It extends from the neighbourhood of Johnstown, in the county of Montgomery, to the Hudson river, near Fort Edward; and covers, in its width, the greater part of the county of Saratoga. In the year 1770, a partition was made of this immense tract of land, when the ground, from which the springs at Saratoga issue, were included in the portion allotted to the representatives of Rip Van Dam; and those at Ballston Spa, to the representatives of Mary Bickley, two of the original patentees.

The spring first discovered, was the *High Rock* ; and by the tradition of the Indians, it appears that they were well acquainted with its medicinal qualities long before the country was explored by Europeans. Their attention was first attracted to the spot by the great quantity of game that frequented the place as a salt-lick ; and they became more attached to it from a discovery of the efficacy of the water in the removal of rheumatism, and some other complaints, to which they were subject.

The first communication, by the Indians, was made to Sir William Johnson, who was occasionally afflicted with the gout. They advised him to the use of the water of this fountain ; and, in the year 1767, he was persuaded by them to undertake the journey from his farm near Johnstown, about thirty miles distant, and was conveyed by them to the spring. Passing, in his route, by Ballston lake, he spent the night at a new settlement just then

formed, by Michael M'Donald, whom Sir William engaged to accompany him. They proceeded by a road, through the wilderness, which the Indians cut for them, remained at the spring for some time, returned improved in health and afterwards published to others the valuable qualities of the water.

Sometime after Sir William's return, a man by the name of Norton, influenced by the growing celebrity of the spring, obtained a permission from the owners of the soil to erect buildings and clear the land in its vicinity. Under this permission, a small hut was built and a clearing made. But the fear which the hostile Indians inspired, during the revolutionary war which commenced about this time, induced Norton to abandon his improvements.

At the termination of the war, Norton resumed his occupancy; and about the years 1784 and '85, other improvements were made, by the arrival of new settlers, which afforded accom-

modations to a few invalids. About this time, the Flat Rock, the President and the Red Spring were discovered; but although the company resorting to them increased annually, the accommodations remained nearly stationary for many years.

The settlement at Saratoga received a check from the discovery of the Springs at Ballston, about the year 1787. Situated in the midst of a flourishing country, those springs had advantages which were not, at that time, possessed by Saratoga. These advantages were eagerly embraced by the proprietors of the lands on which the springs were situated, good houses of accommodation were erected, and other improvements made with great rapidity.

The Saratoga springs continued to languish under the neglect of the owners, until 1803, when the valuable qualities of the Congress Spring, induced Mr. Putnam, (to whose enterprise the public are greatly indebted)

to erect a large house of entertainment near it; since which time, the waters of Saratoga have gradually gained a celebrity that appears as firmly, as it is justly, established.

The concourse of visitants, who frequent the *numerous* houses of entertainment, that have been lately erected in the village, affords a well grounded expectation that it will ever continue the resort, not only of invalids, but of the gay and fashionable.

Situated in an elevated country, the atmosphere is extremely clear and cool, forming a pleasing contrast to the oppressive heats of the south: a great number of visitors will, therefore, be attracted to this spot during the hot months of the year, not only by the salubrious waters of the different springs, but by the very healthy and pleasant situation of the place.

Perhaps few situations in our country afford, to the visitant, more numerous sources of amusement than these springs. The Saratoga lake, at

the distance of four miles, invites the sportsman to fish on its extensive and limpid waters, or to shoot on the low grounds, forming a part of its margin, which abound with wood-cock. The lovers of Trout have the means of gratifying their palates, by eating the most delicate and well flavoured, at Barhite's, about two miles distant. Lake George, the spot, of all others, combining, most agreeably, the *sublime* and the *pretty*, is but twenty-eight miles on the north. At that place, the artist may select innumerable points of view to occupy his pencil. The angler will find a recompense for his toils; and the observant tourist may amuse his friends by giving them true descriptions of what must please.

On the Hudson there are three falls or cataracts, which merit notice. The first, or highest up the river, is at Hadley-landing, fourteen miles distant; the second, is Glen's falls, on the road to Lake George; and the third, at Sandy-Hill. The two last are about

eighteen miles distant from the Springs. The height of these falls is estimated at forty feet.

The roads, leading to all these places, are good, particularly when they pass over the plain country; as they are there not only level and dry, but frequently hard and smooth, in consequence of the admixture of loam with sand. The invalid can, therefore, select such route from the springs as may best suit the state of his health. If feeble, or afflicted with painful disease, he may ride on the plains without fatigue; or, if more vigorous and courting exercise, he may mount the hills in Greenfield, on the north, where, in a tour of eight or ten miles, he may enjoy a mountain scenery.

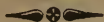
The establishment of a line of steam-boats from New-York to Montreal, by the way of Lake George and Lake Champlain, places this village in the great road between those cities. Its importance, therefore, as a resting place, will be much enhanced, as the

travellers between those great marts, (from both which it is nearly equidistant) may gratify their curiosity without deviating from their route, and enjoy, while there, a constant and convenient intercourse with either place.

ANALYSIS

OF THE

WATERS.



A description of the various processes, by which the results here stated were obtained, will be interesting and satisfactory to those who are acquainted with the science of chemistry; and to such, the following brief sketch will be sufficiently explicit.

The processes consisted of such as were performed with a view to ascertain the *number* and *qualities* of the different substances contained in the several waters under consideration; and of such as were instituted with a view to ascertain the *quantities* of the various substances.

The first intention was principally answered by the application of various chemical re-agents to the waters of the several springs, the number and

effects of which will be noticed in the description of the fountains to which they were applied; from the perusal of which, it will be observed, that the conclusions here drawn, correspond, in all essential particulars, with those already published by Dr. Seaman, in his "Dissertation on the Mineral Waters of Saratoga and Ballston," and corroborated by the later observations of Dr. Vandervoort, and Mr. Griscom, an eminent chemist, of New-York. It is, therefore, presumed that, from the weight of such authority, the most scrupulous will be satisfied that the medical properties of these waters are entirely owing to their containing the following substances, viz.

Carbonic acid Gas,
Muriate of Soda,
Carbonate of Soda,
Carbonate of Lime,
Carbonate of Iron, and
*Carbonate of Magnesia.

* A late analysis, of some of these waters, published at Philadelphia by a Dr. Meade, gives, in addition to

Two springs in the vicinity, not heretofore examined, contain, in addition to the above articles, (excepting carbonate of magnesia) *sulphuretted hydrogen gas*.

This fact being fully established, it is hardly necessary to observe, that the several medicinal springs, at Saratoga and Ballston, do not derive their different effects upon the system from any difference in the *qualities* of the articles they contain, but simply from a difference in the *quantities* of the substances common to all.

It remains to show the processes by which the substances were separated, and their quantities ascertained.

A quantity of the water, from each spring to be examined, was carefully

these articles, accepting Carbonate of Soda, *Muriate of Lime and Muriate of Magnesia*. That the waters, however, do contain *Carbonate of Soda* is established on the authority of a number of eminent chemists, and is so easy to demonstrate, that it is only mysterious how it should have escaped the notice of the most superficial observer. As these salts are incompatible, in any *notable* quantity, in the same water, the conclusion is irresistible, that *Muriate of Lime and Muriate of Magnesia* do not enter into their composition.

measured and placed in separate glass vessels, in a sand-bath, the temperature of which was raised to from 150 to 170 degrees, the vessels being covered with three or four folds of fine crape, to prevent the access of dust or sand. In this situation the water was suffered to evaporate completely, when the vessels were removed, the residuum, being carefully collected and weighed, was thrown into about ten times its weight of cold, recently distilled water, in which it was suffered to remain several hours, being frequently agitated. It was then filtered, and the insoluble part, having been well washed, was again dried and weighed, its loss giving the quantity held in solution by the water.

To this solution was added an infusion of purple-cabbage, which immediately gave the whole a beautiful green colour, evincing the presence of an alkali. Muriatic acid, diluted by the addition of ten times its bulk of water, was then combined, drop by drop,

with the solution, until the purple colour of the cabbage was restored; the number of drops required to produce this effect being noticed. The solution was then placed in a sand-bath, and the water again suffered to evaporate in a temperature of ninety degrees. The process terminated in the formation of entire cubic crystals, which, from further examination, proved to be pure muriate of soda.

The *quantity* of the carbonate of soda, contained in the solution, was inferred from having previously ascertained the number of grains required to neutralize a given number of drops of the dilute muriatic acid.

The insoluble residue was then submitted to the operation of very dilute sulphuric acid, added in small quantities at a time, until it was brought to the exact point of saturation. It was then suffered to stand several days, and occasionally, a drop of the dilute sulphuric acid added, to complete the solution of the iron; after which it was

filtered, and the iron precipitated from the solution in the form of prussian blue, by the addition of prussiate of lime.

The solution, being separated from the precipitated prussiate of iron, was placed in a sand-bath, and the sulphate of magnesia separated from that of the lime, by evaporation, and subsequent solution, upon the principle laid down by Henry.

The gas was procured by means of a large bladder, connected, by its neck, to one extremity of a stop-cock, the other being fitted to the orifice of a tin cone, the capacity of which was accurately ascertained in cubic inches. The water, to be examined, was placed in this vessel at the fountain, and the stop-cock, connected with the bladder, immediately applied, its valve being opened. In this situation, it was placed in a water-bath, raised to the boiling point, and there retained until the gas ceased to come over. The contents of the bladder were then re-

ceived over water in a glass jar, gaged to half inches.

The temperature of the room in which the experiments were made, and that of the water over which the gas was received, was kept at seventy degrees.

The idea, suggested by Dr. Seaman, that the gas of these fountains is combined with azote and oxygen, does not appear to be well founded. The weak affinity subsisting between water and *nitrogen*, induces the latter to escape immediately on the first application of heat. Experiments made on the gas thus obtained, does not warrant the belief that a single particle of it is azotic; at any rate, if there is any, it is in so small a quantity as not to be indicated by any means used for that purpose.

The experiment, mentioned by the Doctor, to prove that the water contains oxygen, is entirely misconstrued. "That the water" (says the Doctor,) "contains this last" (oxygen) "is prov-

ed by its precipitating an *ochery substance*, after having had some sulphate of iron dissolved in it in a well corked vial." This fact is to be explained without *presuming* the presence of oxygen.

Sulphate of iron is decomposed on being mixed with the water from any of the fountains, the sulphuric acid having a stronger affinity for soda, magnesia, &c. than it has for its iron, unites itself with these, while the carbonic acid, connecting itself with the divorced iron, forms the *ochery substance* or red carbonate of iron.

From every consideration, there can be no doubt, that the great quantity of ærial fluid obtained from these waters, is the pure carbonic acid gas, uncombined with any other gaseous substance whatever.

It is necessary to notice one other experiment of Dr. Seaman's, from which he erroneously infers "a slight impregnation of sulphur." A solution of nitrate of silver, being combined

with the water, occasions a white precipitate, which, on suffering to stand, becomes of a dark muddy appearance: the dark colour, however, does not take place if the mixture be excluded from the light, and any water impregnated with the saline properties of those under consideration, will tarnish precipitated silver without the presence of sulphur, if it be exposed for any time to the rays of light.

Sulphur is a substance that is not known to combine with water, except through the intervention of *hydrogen*, forming *sulphuretted hydrogen* gas; as it is not pretended that this gas exists in the water, we necessarily conclude that the water does *not* contain a "sulphurous impregnation."

I exempt from this remark the two fountains which obviously manifest to our senses the presence of the gas above mentioned, and shall notice them hereafter under their respective heads.

The analysis will be further illustrated in the course of the following description of the several Springs.

CONGRESS SPRING.



THIS truly celebrated fountain is situated on the westerly border of a low swampy and, at present, uncultivated piece of ground, at the foot of a beautiful little cascade, formed by a small stream that rises about fifty rods to the west of the place.

The Spring was first discovered about twenty-five years since, issuing from a small aperture in one of the rocks situated near the base of the water-fall: the rock, however, by some accident was moved from its place, and the water ceased to flow from its side. Not long after, a gentleman by the name of Putnam, one of the most enterprising among the first settlers of the place, discovered bubbles of air breaking through the water in the middle of the brook. Governed by the hopes of recovering the original fountain, he turned the stream from its course, and having removed the earth

to the depth of about eight feet, discovered a strong mineral water rising from among the stones and gravel of the bottom in numerous places. He then prepared a conical box, and having placed the widest end of it so as to include the greatest number of these little fountains, replaced the earth around it, and thus secured to posterity the possession of a mineral water, which, for its peculiar medicinal properties, stands unrivalled in the annals of the world.

The water rises in the curb to a little above the surface of the brook, (which still passes around it) but seems unwilling to mount much higher; it escapes through a hole in the side at a rate considerably less than a gallon a minute; but when the pressure has been removed by lessening the *column* of water in the curb, as when it has been rapidly dipped out, it rushes in with greater violence, and it becomes difficult, if not impossible, to remove the whole contents of the well.

The gas escapes through the water in fine bubbles, giving to the surface the appearance of simmering, not unlike that which water exhibits just before the process of violent ebullition takes place.

When first dipped, the water is remarkably limpid, and were it not for the constant escape of free carbonic gas in numerous fine specks, it would be perfectly transparent. It, however, becomes turbid after standing a few hours exposed to the air, and deposits a sediment.

Its effect upon the taste is a predominant sense of salt and carbonic gas, not unpleasant to those who are in the daily use of it. When swallowed, its effects depend in a great measure upon the state of the stomach at the time of receiving it, and upon the quantity drank; when taken however, in a moderate draught, by a person in tolerable health, the sensation is seldom if ever unpleasant, and to most people, who are in the habitual use of

it, particularly in the hot season, the beverage is delightful.

Its most obvious effect, when taken as a medicine, is that of a cathartic and diuretic. In most habits this effect is produced by drinking five or six half pints in the morning before eating; soon after taking it the person feels a sense of fullness about the stomach and bowels, attended with eructations of fixed air, a slight giddiness of the head and a sensation bordering on a disposition to sleep. These feelings, however, are soon removed by the copious discharges that almost immediately follow, leaving the stomach with an increased appetite for food, and the desire for exercise unshackled with languor.

The temperature, by *Farenheit's Thermometer*, at the bottom of the spring, is fifty degrees, and it does not suffer any sensible change during the winter or summer; neither does the season appear to have any effect in

diminishing or increasing the quantity of water.

The application of the following reagents illustrate its composition.

Infusion of purple-cabbage, gives first a blue colour, which soon becomes a beautiful green.

Tincture of litmus, becomes red.

Tincture of galls, tea, &c. gives a purple colour, as do all the vegetable astringents. This experiment does not succeed after the water has been boiled, or has stood for a long time exposed to the air.

Nitrate of mercury, produces an immediate milky appearance, which terminates in a white precipitate.

Nitrate of silver, produces a copious white precipitate, which on being suffered to stand, becomes of a dark, muddy appearance; the dark colour, however, does not take place, if the mixture be excluded from the rays of light.

Muriate of barytes, produced no sensible effect.

Acetate of lead, produces a cloudiness, terminating in a dense sediment.

Caustic ammonia, a white precipitate.

Caustic alkali, a more dense precipitate.

Prussiate of lime, produced no effect, but on the addition of a small quantity of sulphuric or nitric acid, the prussiate of iron was immediately formed and precipitated.

Sulphuric acid, produced a copious disengagement of fixed air.

Nitric and muriatic acids, a less copious disengagement of gas.

Citric acid, a turbidness.

Oxalic acid, an immediate precipitate.

Lime water, a turbidness.

These experiments indicate the presence of carbonic acid, a carbonated alkali, carbonated earths, and a carbonated iron, together with a muriatic salt.

Further experiments, conducted in the manner heretofore stated, gave the

following actual contents of one gallon, or 231 cubic inches of the water.

Muriate of Soda,	471.5
Carbonate of Lime,	178.476
Carbonate of Soda,	16.5
Carbonate of Magnesia,	3.356
*Carbonate of Iron,	6.168

Total, 676 grains.

Carbonic acid gas, 343 cubic inches.

It will be perceived, from the above statement, that the quantity of fixed air vastly exceeds any thing yet dis-

* From the well directed experiments of Dr. Dana, on a small quantity of the water of this Spring, published at Boston, in the New-England Journal, it appears that the presence of *iron* was not discoverable; but had the Doctor taken the precaution to have rinsed the bottle in which the water was transported, with a weak solution of sulphuric or other acid, he would have succeeded in producing those evidences of iron which are so conspicuous at the fountain.

The fact is, that some of the properties of the waters, particularly the iron, is held in solution by so weak an affinity, that the escape of the smallest quantity of gas, or even *rest*, conduces to its deposit, in which case it adheres with such tenacity to the sides of the vessel, from the circumstance of its taking a small quantity of lime along with it, that it becomes difficult to disengage it without the assistance of an acid.

covered, and that this, combined with the marine salt, and various carbonates, give to the waters of this fountain, in their cathartic properties, a decided preference over every thing of the kind hitherto known.

It is recommended and used with propriety in all those chronic cases where cathartics and gentle aperients are indicated; and one of the most valuable properties which it possesses is, that when properly taken, it may be persevered in for almost any length of time, and a daily increased evacuation from the bowels produced, without debilitating the alimentary canal, or in any way impairing the digestive powers of the stomach, but on the contrary, the spirits, appetite, and general health will be improved.

The good effects of this water is likewise particularly noticed in obstructions of the liver, and other organs connected with the functions of the stomach and intestines; and in

most of those complaints resulting from a residence in a hot climate, or the habitual use of ardent spirits.

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COLUMBIAN SPRING.



THIS fountain discovers itself at the foot of a steep bank, consisting principally of sand and yellow loam, about fifteen rods westerly from the Congress, and a short distance from the south side of the brook.

The water being confined by a curb, rises a few inches above the surface of the surrounding earth, and escapes through a small hole made for the purpose.

The well is sunk about six feet, and the water comes in so fast as to render it difficult to empty it by dipping, even with a bucket.

The surface of the water, when viewed in the fountain, does not present the simmering appearance so conspicuous in the Congress, but the gas breaks up through it in large bubbles at irregular intervals, giving to the water the resemblance of a more violent ebullition. The surface of the

earth, over which the water escapes, is covered with the carbonate of iron and lime.

The water is quite limpid, and, when drank, betrays its chalybeate properties to the taste, together with the sense of carbonic gas. Its temperature is the same as the Congress, and the application of tests evince the presence of the same qualities, differing only as to quantity.

One gallon or 231 cubic inches of the water, from a careful analysis, yielded the following result.

Muriate of Soda,	- -	201.5
Carbonate of Soda,	-	22.5
Carbonate of Lime,	-	121.
Carbonate of Magnesia,		1.5
*Carbonate of Iron,	- -	7.5

Total, 354 grains.

Carbonic acid gas, 236 cubic inches.

* I am aware that the quantity of carbonate of iron here given, will appear quite too great to those who are governed, in their opinion on the subject, by the position laid down by *Bergman* and some others, that water,

This water seldom operates as a cathartic, unless taken in large quantities, or when used by persons whose stomachs are extremely irritable. Its most obvious effects, when taken in proper doses, are diuretic, at the same time operating on the secretions and excretions generally: it likewise exhibits the powers of a mild and pleasant stimulant, and as a tonic, if we are to judge from the quantity of iron which it contains, is not *excelled* by any natural water yet discovered.

saturated with fixed air, cannot be made to dissolve more than half this quantity. That water, however, in a *natural state*, frequently contains a much greater quantity of this substance than what *Bergman* could induce it to take up, is abundantly evident. Dr. Jameson, in his analysis of one of the Montpelier wells at Cheltenham, in England, makes it to contain 7 15.100 grains of carbonate of iron to the gallon; and that distinguished and excellent chemist, *Professor Silliman*, of New-Haven, says, in a letter to the author, "I confess, from what I remember of the waters, I should have expected more iron and more carbonic acid, although I am aware that the quantity of the latter is large. In a water that contained only 14 grains of foreign matters to a gallon, I found carbonate of iron *six* grains."

WASHINGTON SPRING.



THIS fountain is situated by the side of a rill of remarkably pure water, at present in the bushes, about fifty rods to the southwest from the last described spring, and is elevated about twenty feet above the surface of the Congress.

The ground around it is incrustated with calcareous and ferruginous substances. The water is limpid, sparkling, and acidulous. Its temperature is 48 degrees: and one gallon affords the following contents.

Muriate of Soda,	- -	231.5
Carbonate of Soda,	-	16.5
Carbonate of Lime,	-	127.5
Carbonate of Magnesia,		2.5
Carbonate of Iron,	- -	6.

Total, 384 grains.

Carbonic acid gas, 247 cubic inches.

The water of this fountain is seldom drank; but on account of its remote situation, is resorted to by the indigent, for the purpose of external application, and is found to be of eminent service when applied to old, ill-conditioned ulcers, and obstinate eruptions of the skin,

HAMILTON SPRING.



THIS is situated in the marsh, which forms the border of the brook, about fifty rods in a northeast direction from the Congress.

The well is sunk about eight feet through a loose black earth; a wooden curb prevents the egress of the water, which rises from the bottom, and likewise secures it from the intrusion of foreign substances. The external appearance around the spring is similar to those already spoken of, and the presence of gas is evinced by the almost constant and violent commotion produced by its escape. Its temperature is 48 degrees; and one gallon is found to hold the following articles in solution.

Muriate of Soda, - -	269.5
Carbonate of Soda, -	24.5
Carbonate of Lime, -	147.5
Carbonate of Magnesia,	7.5
Carbonate of Iron, - -	3.0

Total, 452 grains.

Carbonic acid gas, 284 cubic inches.

This water ranks among the first as a diuretic and antacid, and from its saline properties is frequently used as a substitute for the Congress, in those cases where the irritable state of the stomach renders the more drastic effects of that water inadmissible.

This fountain likewise furnishes a supply of water for the bath-house, which is situated near it on the opposite side of the brook, and is the most convenient and secure of any the place at present affords.

FLAT ROCK SPRING.



FOLLOWING the course of the brook about one hundred rods from the Hamilton, we come to this fountain. It discovers itself on the verge of a marsh, at the foot of a steep bank, which terminates the west side of the valley through which the brook passes; this bank is composed of argillaceous earth and sand, and is elevated about forty feet above the brook.

The earth around the spring is incrustated by a friable rocky substance, *calcareous tufa*, which extends to the distance of several feet, and forms a dry and commodious platform for those who visit it; this rock is simply the usual deposit from the water, combined with sand, leaves, sticks, &c. for which it is indebted to the wind and rain, and is no more than what happens about any of the fountains, where the water is suffered to stagnate in their immediate vicinity.

Near the centre of this platform, the water rises to the surface and issues in a small stream. The well is eight or nine feet deep, and is curbed to prevent the intrusion of foreign substances.

Its external appearance and taste resembles the Columbian, and the analysis confirms the similarity.

Its temperature is 48 degrees, and one gallon affords the following articles :

Muriate of Soda,	- -	194.8
Carbonate of Soda,	-	11.2
Carbonate of Lime,	-	107.
Carbonate of Magnesia,		1.5
Carbonate of Iron,	- -	7.5

Total, 322 grains.

Carbonic acid gas, 252.5 cubic inches.

This water is used in all cases for which the Columbian is recommended, and has hitherto been considered as the best chalybeate spring the place afforded, and on that account, has

been the most frequented. It is by no means improbable that there are cases in which this water will answer a better purpose as a tonic, than the Columbian, from its containing a greater quantity of fixed air, a less quantity of the saline principle, and at the same time, an equal quantity of iron.

HIGH ROCK SPRING.



PURSUING the course of the valley about one hundred rods further, in a northerly direction, we come to the High Rock. It is situated near the bottom of a ledge of rocks, which at this place marks the westerly side of the valley, and is composed principally of calcareous earth, in which are imbedded large masses of horn stone and quartz.

The water of this fountain is surrounded by a conical rock, calcareous tufa, which is, very justly, considered the greatest natural curiosity which the country affords; its diameter, at its base, is between eight and nine feet, and its height between five and six; at its top is a circular opening, nearly twelve inches in diameter, which gradually widens as the rock enlarges, leaving its walls of nearly an equal thickness throughout. In this cavity the water rises to within two

feet of the top, and is there seen constantly agitated by the incessant escape of carbonic gas, for which the vacancy, above the water, forms a capacious and secure *reservoir*, where the curious are frequently entertained by its deleterious effects on animal life.

This rock, like those we have before described, is composed of ferruginous particles, and calcareous earth, combined with sand and such other articles as accident threw in the way. It is however, more compact in its structure, and particularly about its top, less friable.

That this curious production owes its origin to the water, will not admit of a doubt, and that the fountain once issued from the cavity and descended upon its sides, is equally certain; but the precise manner in which the rock was formed, or the time when the water ceased to flow upon its surface, is not so obvious. I am disposed to believe with Dr. Scaman, that the basis

of this mass was commenced beneath the surface of the earth, that the water, thus cooped up within the limits of its own sediment, continued to rise, and escaping over the sides of its prison, constantly added to the dimensions of its walls. In this manner it would continue to rise until the column of water in the curb, balanced the power that compelled it up, in which case it would become stationary; and it is but fair to conclude, that in process of time, the power, so propelling the water, might be diminished, when the water in the rock would sink in exact proportion to the loss of that power.

The idea propagated by the inhabitants, that the water owes its escape to a fissure, occasioned by the fall of a tree, appears to be entirely fabulous, as the fountain was visited as early as the year 1767, and no appearance to induce such a belief presented itself at that time, and yet the water did not reach the top of the rock by several inches.

The appearance or taste of the water does not materially differ from those already described. Its temperature is 48 degrees, and a gallon affords the following contents.

Muriate of Soda,	- -	210.
Carbonate of Soda,	-	18.
Carbonate of Lime,	-	115.
Carbonate of Magnesia,		.5
Carbonate of Iron,	- -	4.5

Total, 348 grains.

Carbonic acid gas, 243 cubic inches.

The singularity of this fountain first introduced it to notice, and for a long time it remained the only one in use, when much was said by the credulous of its *astonishing effects* in the cure of almost all diseases. From the above analysis however, it does not, at present, appear to possess properties to distinguish it from most of the others in its neighborhood.

It is a mild cathartic, but is principally used as a restorative; and is found to be an efficacious diuretic.

PRESIDENT SPRING.



ABOUT thirty rods from the High Rock, in the same valley, is the President spring. It is about four feet deep; the water breaks up through the fissures of a ledge of pure lime rock, that forms its bottom, and furnishes an ample supply in the wooden curb that protects it. It is remarkably sparkling. Its temperature is 51 degrees, and a gallon affords the following ingredients.

Muriate of Soda,	-	-	135.
Carbonate of Soda,	-	-	19.
Carbonate of Lime,	-	-	107.5
Carbonate of Magnesia,			2.5
Carbonate of Iron,	-	-	6.

Total, 270 grains.

Carbonic acid gas, 314 cubic inches.

The water of this fountain is much drank, and from the great quantity of fixed air which it contains, is a re-

freshing and pleasant beverage. It is highly serviceable in urinary affections, and is much used as a discutient in diseases of the skin.

RED SPRING.



THIS is situated near the road in the border of the marsh, in a north-east direction from the President. It receives its name from the carbonated iron that is observed about it, and the water when agitated, has numerous particles of fine sand, stained with this substance, floating in it which gives it a red appearance. The temperature is 48 degrees, and the analysis of a gallon gives the following proportions.

Muriate of Soda, - -	117.52
Carbonate of Soda, -	24.48
Carbonate of Lime, -	97.
Carbonate of Magnesia,	3.
Carbonate of Iron, - -	6.

Total, 248 grains.

Carbonic acid gas, 150.5 cubic inches.

Popular opinion has sanctioned the use of this water as an application to ill-conditioned ulcers and diseases of the skin, and it is much more used for this purpose than for any other.

TAYLOR'S SPRINGS.



WITHIN a few years, a number of springs have been discovered, in the course of the same valley, on land belonging to John and Ziba Taylor. They are situated about one mile in an easterly direction, from the High Rock. The soil, through which they discover themselves, is composed of argillaceous earth and sand, combined with the usual deposits, iron and lime.

From among several that have been opened and curbed, three have been selected as possessing strong medicinal qualities. These have received from their proprietors the distinguished names of Washington, Jackson and Alexander. Of these, the Washington of course, ranks pre-eminent, and, in its saline properties, is only inferior to the Congress.—The water is clear and sparkling. Its temperature is 48 degrees, and a gallon yields

80 *Description of the Springs.*

Muriate of Soda, - -	313.54
Carbonate of Soda, -	26.46
Carbonate of Lime, -	140.
Carbonate of Magnesia,	5.5
Carbonate of Iron, - -	4.1

Total, $489\frac{6}{10}$ grs.

Carbonic acid gas, 251 cubic inches.

This water may be used, with propriety, in most cases for which the Congress is recommended; the quantity, however, requires to be somewhat increased in order to have the same effect upon the bowels. In calculous and nephritic complaints, it might be supposed to have a preference on account of its alkaline property.

JACKSON.

THIS Spring is a few yards from the Washington, in a northwesterly direction. The fountain was completely covered with a thick incrustation of calcareous tufa, of the usual appear-

ance and consistence.—The temperature is 50 degrees, and a gallon affords

Muriate of Soda, - -	240.
Carbonate of Soda, -	18.
Carbonate of Lime, -	103.8
Carbonate of Magnesia,	3.
Carbonate of Iron, - -	5.2

Total, 370 grains,

Carbonic acid gas, $256\frac{5}{10}$ cubic inches.

ALEXANDER.

THIS is on the verge of the brook, twenty or thirty rods from the Jackson, in an easterly direction; its appearance and taste is similar to the others. The temperature is 48 degrees, and a gallon affords,

Muriate of Soda, - -	238.4
Carbonate of Soda, -	19.6
Carbonate of Lime, -	119.5
Carbonate of Magnesia,	7.
Carbinate of Iron, - -	5.5

Total, 390 grains.

Carbonic acid gas, 253 cubic inches.

The properties of these fountains entitle them to no small share of respect; and it is by no means improbable, that when proper accommodations are prepared, they will receive the attention of the diseased, particularly of those who may wish to be retired from the noise and turmoil of the fashionable circles that throng the Congress.

WALTON SPRING.



ON land belonging to Henry Walton, Esq. a few rods from the Flat Rock, and on the margin of the brook, evidences of a mineral spring had been observed for several years past; but owing to the difficulty of approaching the spot, by reason of its being surrounded by a wet marsh, it had been seldom visited, and never cleared out. During the past winter, however, considerable pains has been taken to render the place accessible, and a tube, made of strong plank, secured by iron bands, was forced into the earth to the depth of twenty-two feet; through this tube the water immediately arose some feet above the surface of the surrounding marsh, exhibiting a lively sparkling appearance, and a smartness of taste that is not exceeded by any of the fountains hitherto examined. The first eight feet through which the tube passed, is a perfect *fibrous*-

peat, the remaining fifteen feet an *earthy marl*,* alternating with thin strata of siliceous sand. This marl, covered by a thick stratum of vegetable remains, forms the bed of the vale in which all the springs, in this vicinity, are situated, and it is highly probable that they all have their source from beneath it; the water, in some instances, forcing its passage to the surface through the substance of the marl itself, but in others, finds a less obstructed egress along the union of the marl with the lime-stone which borders the west side of the valley where the fountains are the most numerous.

The temperature of the water of this spring is uniformly 47 degrees, and a gallon affords

* This substance appears likewise to form the bottom of the valley at Ballston Spa, where it has been called "blue clay," and "stiff blue clay;" it however contains, in different places, from thirty to sixty per cent. of carbonate of lime, and being found in numerous instances along the whole course of the secondary formation, will, no doubt, become a useful and important *manure*, particularly when applied to the sandy soils so abundant in its neighborhood.

Muriate of Soda, - -	274.8
Carbonate of Soda, -	5.2
Carbonate of Lime, -	140.
Carbonate of Magnesia,	7.
Carbonate of Iron, - -	7.5

Total, 434.5 grs.

The analysis likewise evinced the presence of a small quantity of *silex* and *alumine*.

The carbonic acid gas is in great abundance, and renders the water a delightful beverage.

H

ELLIS' SPRING.



ABOUT two miles from the Congress, in a southerly direction, on land belonging to a Mr. Ellis, is another mineral fountain distinguished by the name of Ellis' Spring. It is situated in a deep valley on the side of the principal northern branch of the Kayaderoseros creek, the banks of which, at this place, rise nearly fifty feet above its bed, and are frequently indented by deep valleys that open into the creek, the side of one of these having been lately denuded, for the purpose of erecting mills, furnishes a favorable opportunity for inspecting its structure; the appearance of which is as follows: First,

A mixture of clay and gravel,	2 feet
Coarse gravel and sand, with a great variety of small stones, generally smooth.	4

At the bottom of this stratum issues a spring of very pure water which is never dry, and retains a temperature of 50 degrees.

Coarse gravel, sand, and clay, with paving stones, -	20 feet.
Red oxide of iron, combined with sand and clay, -	2
Clay and coarse gravel,	4
Lamellated slate, suitable for domestic uses, although it has not as yet been work- ed for that purpose, -	3
Coarse gravel and clay,	4
Another stratum of lamellated slate, which extends be- neath the creek, to an un- known depth, - -	10
<hr/>	
49 feet.	

These strata are all placed nearly in a horizontal position, and are well defined.

The valley in which the mineral fountain discovers itself is of a semi-

circular form, including the area of an acre.

Differing from all the others of the kind, this water issues from the bank in a *horizontal* direction; it betrays its character the moment it approaches the light, by its sparkling appearance, and the deposit of its iron, which stains the walls of the little rill, as it trickles down the declivity to the marsh, a few feet below, where it has formed a compact rocky substance, resembling in all respects, those heretofore described.

The water is remarkably clear, its taste is acidulous and chalybeate, and its temperature is 47 degrees. One gallon yields the following ingredients.

Muriate of Soda,	-	-	188.
Carbonate of Soda,	-		10.
Carbonate of Lime,	-		110.5
Carbonate of Iron,	-	-	7.5

Total, 316 grains.

Carbonic acid gas, 224.5 cubic inches.

From the above analysis, it will be perceived, that as a chalybeate, this fountain is inferior to none; and from its retired and pleasant situation, will, no doubt, become a place of considerable resort.

SULPHUR SPRING.



BETWEEN two and three miles from Ellis' Spring, directly up the creek, and near its side, is a strong scented sulphur spring. It rises perpendicularly from the earth, in a stream sufficient to turn a mill, at the foot of a steep bank, composed of sand and clay, intermixed with a great variety of small stones.

The approach to this fountain is discovered at the distance of some yards, by the sulphurous odour with which it impregnates the atmosphere. The water is clear, and but triflingly agitated by the escape of gas. Its taste is unpleasant, slightly resembling bilge-water. It deposits a brown sediment, which marks its passage to the creek the distance of one hundred yards. Its temperature is 50 degrees, while that of a fountain of pure water, which arises from the same bank, in a

horizontal direction, and within ten feet of it, is at 46 degrees.

Its properties are indicated from the application of the following tests.

It becomes purple from the addition of a solution of nutgalls; but not after boiling.

It becomes green from the addition of purple-cabbage, and red from the addition of litmus.

Nitrate of silver produces a cloudiness which soon becomes of a dark colour when excluded from the rays of light, if the experiment be made with the water fresh from the spring; but otherwise, it does not become dark unless the mixture be left exposed to the rays of light.

Sulphuric acid produces an escape of gas.

Muriate of barytes, no effect.

Oxalic acid, a turbidness.

Lime water, a turbidness.

The following articles were separated from a gallon of the water.

Muriate of Soda,	- -	23.6
Carbonate of Soda,	-	1.4
Carbonate of Lime,	-	33.1
Carbonate of Iron,	- -	1.9

Total, 60 grains.

Carbonic acid gas, 43.5 cubic inches.

Sulphuretted hydrogen, 11 cubic ins.

The proportions, of these two gasses, were obtained by adopting the method proposed by Kirwan. A graduated glass jar was filled with the gas over water, and carefully removed into a vessel containing nitrous acid, the immediate condensing of the sulphuretted hydrogen gave the proportions of each.

The sediment about the spring, is composed of iron and lime, combined with a small quantity of white sand, which the water is constantly bringing up; but no experiments, which I made, will warrant the belief, that it contains the smallest quantity of sulphur.

This water has been used, both externally and internally, in various cutaneous diseases, but from the above analysis, it is probable that the sulphurous impregnation adds but little if any to its virtues in these diseases, and excepting as a source of cleanliness, (which may be found in any other water) it possesses no very important properties as a discutant.

BALLSTON SPRINGS.



THE Village of *Ballston Spa*, is situated about seven miles in a southwest direction from the springs at Saratoga. The great resort to this village, on account of its mineral waters, has made it, like Saratoga, a place of extensive notoriety.

The fountains discover themselves in a marsh at the bottom of a deep valley, through which one of the principal branches of the Kayadarosseros creek passes. The wells have been sunk from six to eight feet, and the water rises from the bottom through a coarse gravel. * The principal fountain is situated near the centre of the

* It has been reported that Sir William Johnson, in conveying the land to individuals, reserved this Spring for the benevolent purpose of serving the public; this however must be a mistake, as that gentleman never owned any lands in this vicinity. The title, under which these lands are held, was obtained from the representatives of Mary Bickley, one of the original patentees, over which Sir William never had even the control of an agency.

village, and the liberality of the inhabitants has ornamented and secured it with a handsome iron paleing, and marble platform. The water rises to within four feet of the top of the curb, and is there seen constantly agitated by the escape of gas. It is remarkably clear and sparkling, and when drank betrays it chalybeate, as well as its gaseous properties, to the taste.

From the repeated applications of the several re-agents to the waters of this fountain, they appear to contain no properties to distinguish them from the waters of Saratoga. Its temperature is 50 degrees, and one gallon, or 231 cubic inches, from a careful analysis, yielded the following result.

Muriate of Soda, - -	159.
Carbonate of Soda, -	9.
Carbonate of Lime, -	75.5
Carbonate of Magnesia,	2.5
Carbonate of Iron, - -	7.

Total, 253 grains.

Carbonic acid gas, 210 cubic inches.

It is highly important to observe, that although the water, from which the above analysis was made, had been carefully bottled and corked at the spring, and had stood but forty-eight hours previous to the process being commenced, nevertheless it is but reasonable to conclude that a minute quantity of the iron had been precipitated before the process was commenced, from the loss of carbonic gas, which the water is known to sustain from being bottled. We may therefore safely conclude that the water of this fountain contains the same quantity of iron as the Flat Rock, Columbian, or Ellis' Spring; that is, $7\frac{1}{2}$ gr. to a gallon, and probably a trifle more than its bulk of fixed air.

This water, if drank in large quantities, or when taken by persons whose stomachs are extremely irritable, operates as a cathartic; it is likewise, in most instances, a powerful diuretic; and like the other strong chalybeates

in the vicinity, “is of eminent service to an impaired or capricious appetite, and weakness of the assimilating organs, in irregular digestion, flatulent distention of the abdomen, anxiety about the *præcordia*, difficult respiration from sympathy with the stomach, occasional vomiting of viscid mucus,” &c.

LOW's SPRING.



ABOUT one hundred rods further down the creek, and near its side, is the bathing or Low's spring. The waters of which resemble in appearance the one already described, and the application of tests indicate the same properties. Its temperature is 52 degrees, and one gallon is found to hold in solution the following articles.

Muriate of Soda,	- -	142.
Carbonate of Soda,	-	10.
Carbonate of Lime,	-	64.5
Carbonate of Magnesia,		1.5
Carbonate of Iron,	- -	6.

Total, 224 grains.

Carbonic acid gas, 220 cubic inches.

SULPHUR SPRING.



WITHIN twenty feet of the last described fountain, is a sulphurous water which betrays its character to the smell and taste. Its temperature is 52 degrees, and the following substances were separated from one gallon.

Muriate of Soda,	- -	64.
Carbonate of Soda,	-	6.
Carbonate of Lime,	-	30.
Carbonate of Iron,	- -	4.

Total, 104 grains.

Carbonic acid gas, 144 cubic inches.
Sulphuretted hydrogen, 7 cubic inches.

The waters of these two fountains are mostly used for bathing. but they are sometimes drank, and the latter is supposed to be highly efficacious in cutaneous diseases.

NEW SPRING, *at Ballston-Spa.*



AT this Village a new Spring has recently made its appearance, the singularity of which, connected with its medicinal properties, has already much increased the celebrity of the place.

During the latter part of the summer of 1817, continued rains had so swollen the small stream which passes through the village, that it burst over its usual bounds, and, in some places, formed for itself an entire new channel. On the subsiding of the flood, the spring in question was discovered by the profusion of air bubbles which it produced, being situated some rods below the public well, and in what was, during the freshet, the bed of the stream. The sand and gravel, which obstructed the passage of the water, being removed, it was found to issue from a circular aperture of several feet in diameter, affording an immense

quantity of water, attended with all the characteristics of a strong mineral impregnation.

With a view to prevent the connection of the water with the clayey stratum, which appeared at no great distance from the surface, and likewise to prevent the intrusion of fresh water, a *tube* was ingeniously constructed and forced into the aperture, from whence the water arose, to the depth of more than twenty feet; through this tube the water rises about five feet above the level of the brook, and falling over its sides, produces, in some measure, the pleasing effect of an artificial fountain; while the surface of the spring, being brought nearly to a level with the eye, furnishes a fine opportunity for inspecting its *sparkling* properties to the greatest advantage.

Near this tube another has been inserted, not however to so great a depth, through which the water rises somewhat above the surface of the earth, and is there suffered to escape. It is

somewhat singular that the water of these two wells, apparently issuing from the same source, should be found to differ in the quantity of the *muriate of soda* which they contain, while the quantities of the other properties are very nearly equal.

The water which flows from these tubes, combined with that which breaks up in the aperture around them, runs off in a stream at the rate of a barrel a minute. It commences the deposit of its *chalybeate* and *calcareous* properties the moment it comes in contact with the atmosphere; and the quantity given off by such a bulk of water, continues to mark its passage along the brook, into which it passes, for the distance of more than a mile.

The temperature of the water is about the same, (50 degrees) and a gallon from the high tube contains

Muriate of Soda, - -	145.
Carbonate of Soda, -	12.
Carbonate of Lime, -	61.5
Carbonate of Magnesia,	9.
Carbonate of Iron, - -	7.5

Total, 235 grains.

A trace of silex and allumine.

The same quantity from the low tube contains

Muriate of Soda, - -	158.5
Carbonate of Soda, -	13.
Carbonate of Lime, -	61.54
Carbonate of Magnesia,	8.5
Carbonate of Iron, - -	7.5

Total, 249.04 grs.

A trace of silex and allumine.

The difference in the quantity of the *carbonic acid gas* contained in the water of these tubes is not material; all the water which issues from the aperture is, like many of the other fountains, both at this place and at Saratoga, as

fully saturated with this article as its situation will admit, while immense quantities of the superabundant gas is constantly escaping.

Practical Observations

On the use of the Waters in Diseases.



I SHALL conclude my observations on the waters of these fountains, by a few general remarks on their application in the various diseases for which they have become so deservedly celebrated.

The waters are so universally used, and their effects so seldom injurious, particularly to persons in health, that almost every one who has drank of them assumes the right to direct their use to others, and even *empiricks*, without any knowledge of their composition, and little or none of their effects, contrive to dispose of their *directions* to valetudinarians to no other purpose than to injure the reputation of the waters, and destroy the prospects of the diseased.

Nothing can be more absurd than the idea that governs many who visit

the *Springs* for the restoration of their health, that they are to recover in proportion to the *quantity* they drink; for although persons in health may, and frequently do, swallow down enormous quantities of the water with impunity, it by no means follows, that those whose stomachs are enfeebled by disease can take the same quantity with the same effect. Stomachs of this description, most frequently, reject the too copious draught, and save the system from the evil consequences that would otherwise inevitably follow, but when it happens to be retained, the result is indeed distressing; the pulse becomes quick and feeble, the extremities cold, the bowels swollen and painful, and the whole train of nervous affections alarmingly increased; and should the unfortunate sufferer survive the effects of his imprudence, it is only to a renewal of his worst apprehensions from a loss of confidence in what he most probably considered a last resort.

Among the great variety of invalids who resort to the Springs, none, perhaps, receive more essential and effectual benefit from their use, than

The Billious and Dyspeptic.

In the first, if the attack be recent and unattended with any serious organic affection, it is most usually removed in the course of a few days, by a free use of the Congress water; but in those cases where the functions of the stomach and bowels have become impaired, from the long continuance of the disease, attended with anasarcus swellings of the extremities, &c. Although the waters of this fountain may be resorted to with nearly the same assurance of obtaining relief, nevertheless, more caution is indispensably necessary in its administration, for, should a great quantity of the water be drank, without having the proper effect by the bowels and kidneys, it is never beneficial; but on the contrary, frequently increases the

most alarming symptoms of the disease. In this case I have been in the habit of recommending the conjunction of some mild cathartic medicine; and for this purpose, two or three grains of *calomel* have been given over night, followed in the morning with three or four tumblers of the water, with the happiest effect; a few doses of this description, usually places the bowels in a situation to be more easily wrought upon by the water alone, and the patient becomes convinced of its efficacy in his disease, from a few days proper application.

In *Dyspepsia*, it is usual to begin a course of the waters with the Congress. This should be taken in the morning before breakfast, four or five tumblers full are commonly sufficient to produce a pretty copious discharge from the bowels, and in weak irritable habits, half the quantity, or a single tumbler full, in some cases, is amply sufficient to answer the purpose, but in those cases where the bowels are

attended with an habitual constipation, the quantity of water required to move them is apt to prove too cold to the stomach, and by producing cold chills and nausea, frequently defeats the general intention of its application; this may be prevented by taking some suitable laxative over night, and a much less quantity of water in the morning will answer the wishes of the patient without subjecting him to any inconvenience. But the water of the Congress is not, alone, to be depended upon for the removal of this disease; when the stomach and bowels have been sufficiently cleansed by the pleasant and innocent purgative properties of this water, recourse must be had to the operation of the more powerful *chalybeates*, these are to be found in the waters of the *Flat Rock*, the *Columbian*, in *Ellis' Spring*, and at the *Spa*.

The quantity of water, from either of these fountains, to be used daily, depends in a great measure on the

state of the disease and the disposition of the stomach; it is therefore necessary to commence their use in small quantities at a time, in distant and regular intervals, gradually increasing the quantity and frequency of the draught as may be most agreeable to the stomach, and least injurious to the feelings. In this way, the quantity may be increased to from one to two quarts a day, and it is questionable whether a much larger quantity may be drank with any additional advantage.

Conjoined with the internal use of the water, bathing should not be forgotten; its exhilarating effect upon the surface, contributes much to the restoration of the vigour and health of the stomach. The cold shower bath should always be preferred where the energy of the system is sufficient to overcome the effects of the cold, and produce the sensation of warmth over the surface of the body immediately after its application. Where this sen-

sation is not produced, the cold bath should be dispensed with, and the tepid or warm bath substituted in its stead, together with general friction, with a flesh brush or coarse flannel, over the whole surface.

The stimulating effects of these waters, arising from their saline and gaseous properties, give them a decided preference over any other, as a bath; and those who are labouring under a deficient or irregular action of the cutaneous vessels, arising either from a sympathetic affection with a diseased stomach, or from an original affection of the vessels themselves, will find it to their advantage to persevere in its use under this form.

The idea of bathing before sunrise or early in the morning, is entirely erroneous. Before bathing, the system should always receive the invigorating effect of moderate exercise and a nutritious repast. The hour of ten or eleven in the forenoon is, therefore, the most suitable time for its application.

In *calculous and nephritic* complaints the waters have long been celebrated for their efficacy; and numerous well attested instances of their good effects can be produced, where the disease was not only mitigated, but effectually cured. In these cases the subjects of them voided large quantities of sand and small gravel; and for some years past have felt no symptoms of the return of the complaint.

The fountains that would seem to promise most in these diseases, are the Hamilton, and Taylor's Washington, as they contain the greatest quantity of the *aerated alkali*. But the waters have been usually drank indiscriminately for this purpose, without reference to any particular fountain; it is, therefore, probable that the fixed air and lime add to the *lithontriptic* properties of these waters.

They should be drank in such quantities as to keep the bowels loose, and repeated sufficiently often to keep up an increased secretion by the kidneys.

Phagedenic, or ill conditioned ulcers of the extremities. Perhaps no application has ever been attended with more effectual benefit in a variety of these affections, than a use of the waters; but the various forms and circumstances, under which this afflictive complaint presents itself, require particular attention, as they form the only criterion for a proper application of this highly useful remedy.

Persons afflicted with obstinate and painful *cutaneous eruptions* derive great and important benefit from a properly directed course of bathing and drinking; and in that peculiarly relaxed and enfeebled state of the system, arising from a long protracted *mercurial course*, the water, connected with the air and exercises of the country, have never failed of proving an efficacious and speedy restorative.

Arthritis, or gout. This disease has but seldom appeared at the springs; whether its absence is to be imputed to the few cases that, comparatively

speaking, occur in our country, or to a prevailing opinion that the use of the waters would be injurious, is uncertain. If, however, one may be allowed to judge from the few cases that have appeared at the waters, there is good reason to believe they may prove highly serviceable, particularly in the incipient or forming stage of the complaint; but in those cases where the disease has become confirmed, and the system been for a long time subject to a course of powerful stimulants, the operation of the waters is more doubtful; and, indeed, several instances have occurred where their use evidently tended to invite a recurrence of the paroxysms.

In *chronic rheumatism*, the virtues of the waters were celebrated by the aborigines, and later observations confirm the justice of their faith. The Congress water has the most celebrity in this disease. It should be drank in the morning, in sufficient quantities to move the bowels two or three times,

followed, through the day, by moderate draughts of some of the other fountains; and in most instances, the *shower bath* will add much to the efficacy of the water. Following this course, for a length of time, gradually relaxes the rigidity of the muscles, adds strength, and facility of motion, to the diseased joints and restores ease and vigour to the whole system.

Scrofula, is another disease for which those who are afflicted with it, frequently become applicants to the waters, and experience has sanctioned the belief of their utility in this afflictive complaint. The chalybeate waters are those from which we are to look for the greatest benefit; they must be commenced in small doses, and the quantity gradually increased as the stomach will bear them, and their use continued at least through the summer months. There are but few of this description that have not received advantage; and numerous instances might be adduced, where

the less seriously affected have perfectly recovered in consequence of a proper course of bathing and drinking.

In *Dropsy*, arising from viceral obstructions of long continuance, the waters are manifestly injurious, as they invariably increase the swelling and add to the sufferings of the patient: but in recent cases where the affection arises simply from a deficient action in the absorbent vessels, the water has a singular effect in removing it; it should be drank in the morning freely, so as to produce a copious discharge from the bowels, and through the day taken in such quantities as to keep up a pretty constant discharge of urine. The bloating is relieved immediately, and a subsequent course of chalybeates, will finally establish the permanency of the cure.

In *Paralysis* the waters have usually been singularly serviceable; the purgative properties of the Congress render it most applicable to this dis-

ease, and its good effects are much increased by the use of the bath.

In *Chlorosis*, and a variety of other complaints peculiar to the female sex, the waters maintain a *high* and *deserved* reputation. In these cases the bowels should be kept loose by the use of the more purgative waters, and the stronger chalybeates should be persevered in for a length of time; their good effects will be accelerated by frequent bathing and moderate exercise.

“The general operation of chalybeates,” (says Dr. Saunders in his *Treatise upon the Mineral Waters of Europe*) “is to increase the power of the secretory system, in a gradual, uniform manner, and at the same time, by the permanency of their stimulus, or some other cause with which we are not well acquainted, to impart a gentle and salutary increase to the body, of strength, tone, nervous energy and general vigour of all the functions. It is, therefore, chiefly in

chronic disorders, in those that arise from slow beginnings, and are attended with great laxity and debility of the solids, but without much organic disease, that these waters are found to be particularly useful."

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A TABULAR VIEW,

Of the comparative Properties of some of the most celebrated Mineral Waters, both in Europe and America; shewing the number and quantity of Articles in four Pints, or 115.5 Cubic Inches, of the Water of each Spring: The quantities put down in Grains and Decimal Parts of a Grain, from the latest Authorities.

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